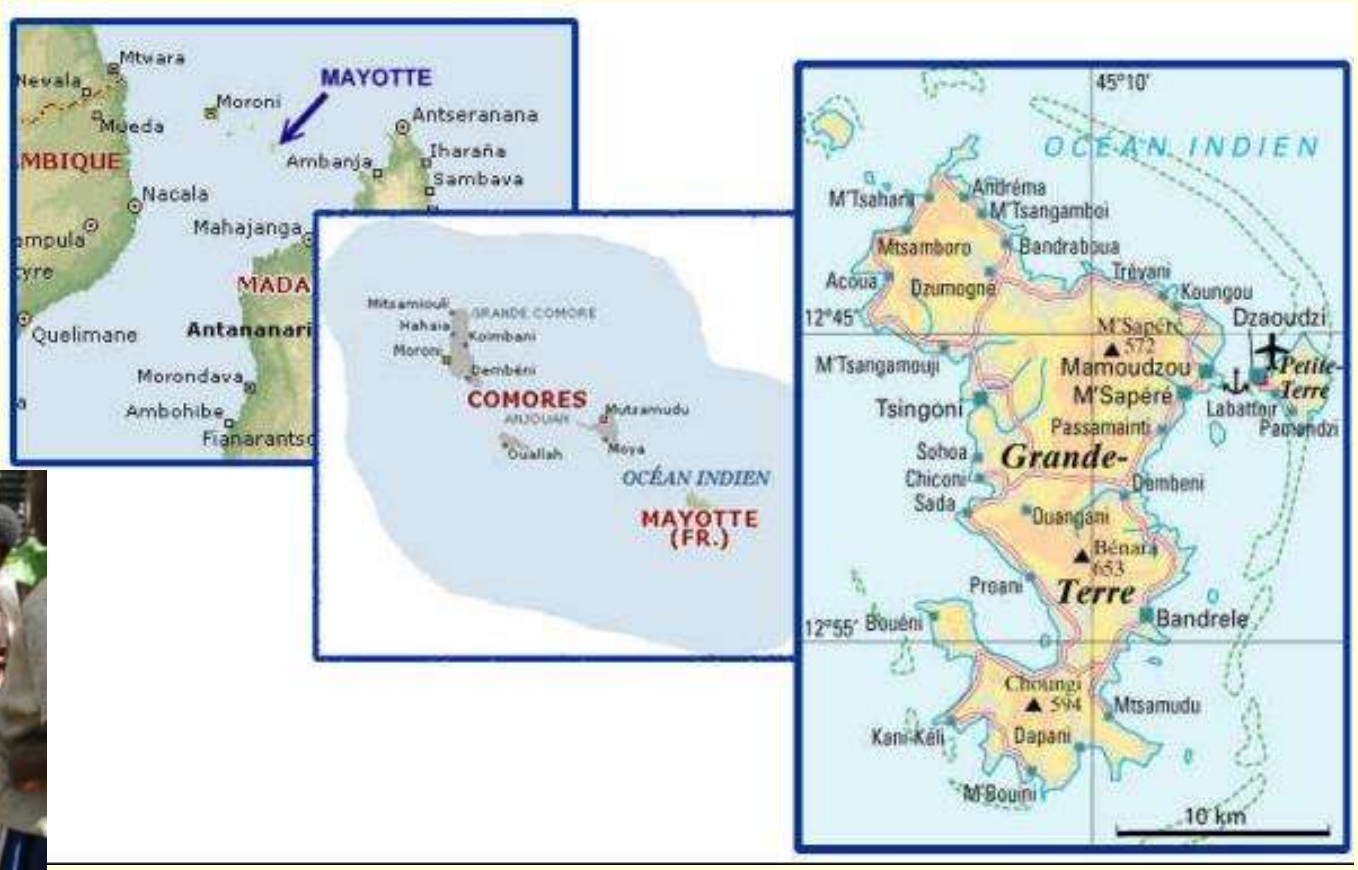
Aedes (Diptera: Culicidae) vectors of arboviruses in Mayotte: distribution area and breeding sites

by Leïla BAGNY
PhD student

Directed by S. QUILICI (CIRAD)
and D. FONTENILLE (IRD)

Introduction

Mayotte



- Epidemics of Chikungunya in 2005-2006 with 38% of populations affected (Cire Mayotte)

Culicidae fauna


Ae. simpsoni


Ae. aegypti

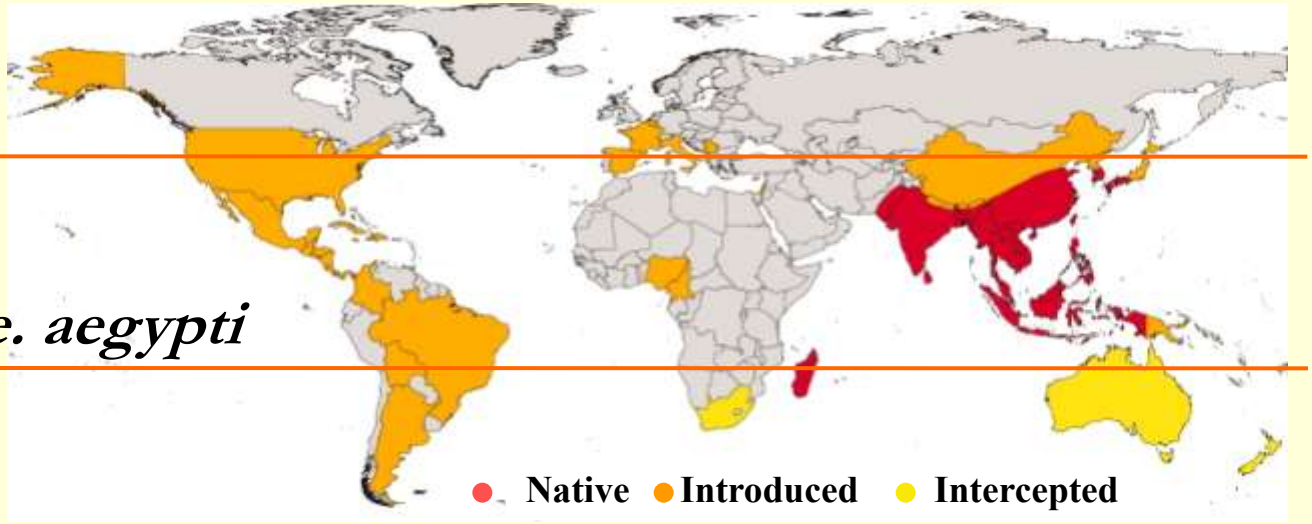

Ae. albopictus

www.wrbu.org

- 35 species of Culicidae recorded : *Anopheles, Culex, Eretmapodites, Mansonia, Orthopodomyia, Ficalbia, Uranotaenia* and *Aedes* (Brunhes 1978)
- *Stegomyia* species: *Ae. vittatus, Ae. simpsoni* complex, *Ae. aegypti* (Brunhes 1978)
- 2001: first record of *Ae. albopictus* on the island (Girod 2004)

Introduction

Aedes albopictus in the world



(Tatem et *al.* 2006)

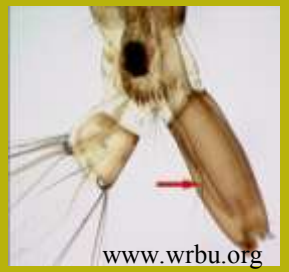
- Invasive since 30 years
- Species mentionned as rural in its native area also in some invaded areas (like Brazil, Florida, Puerto Rico…)

Objectives

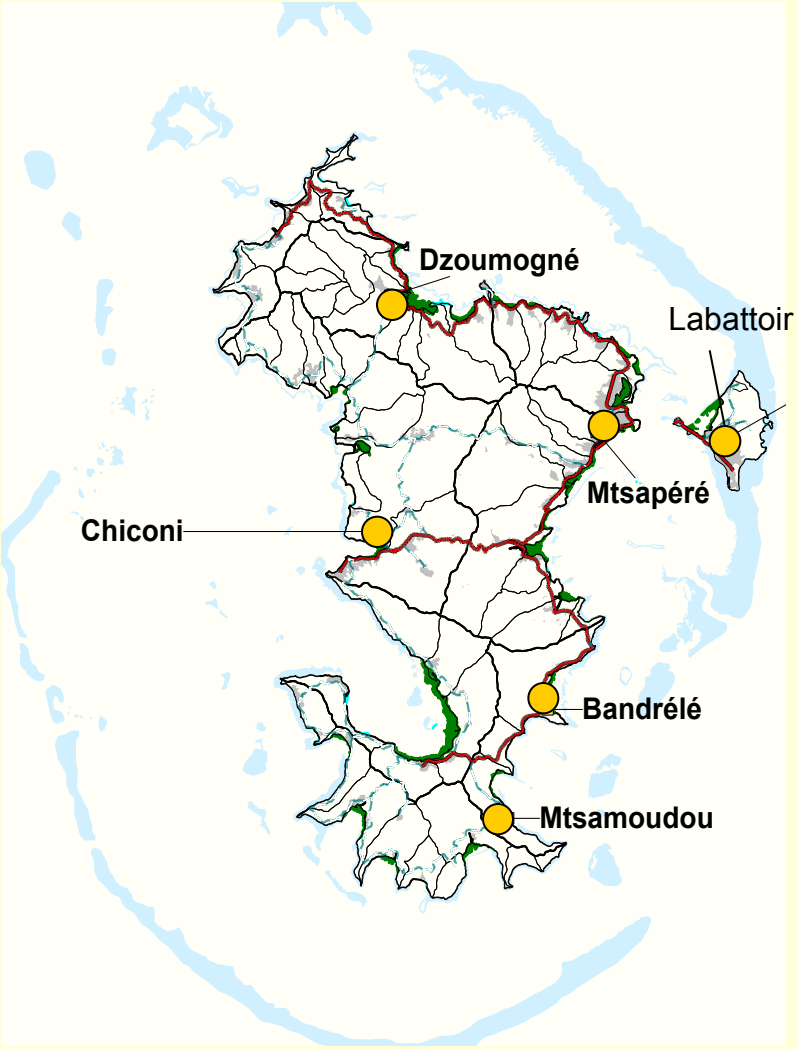
- Update of *Aedes (Stegomyia)* distribution, 7 years after the first record of *Ae. albopictus* in Mayotte
- Is there an impact of the introduction of *Ae. albopictus* on resident species?
- What are the effects of the introduction of this species on public health?

Mat & Meth

Field survey

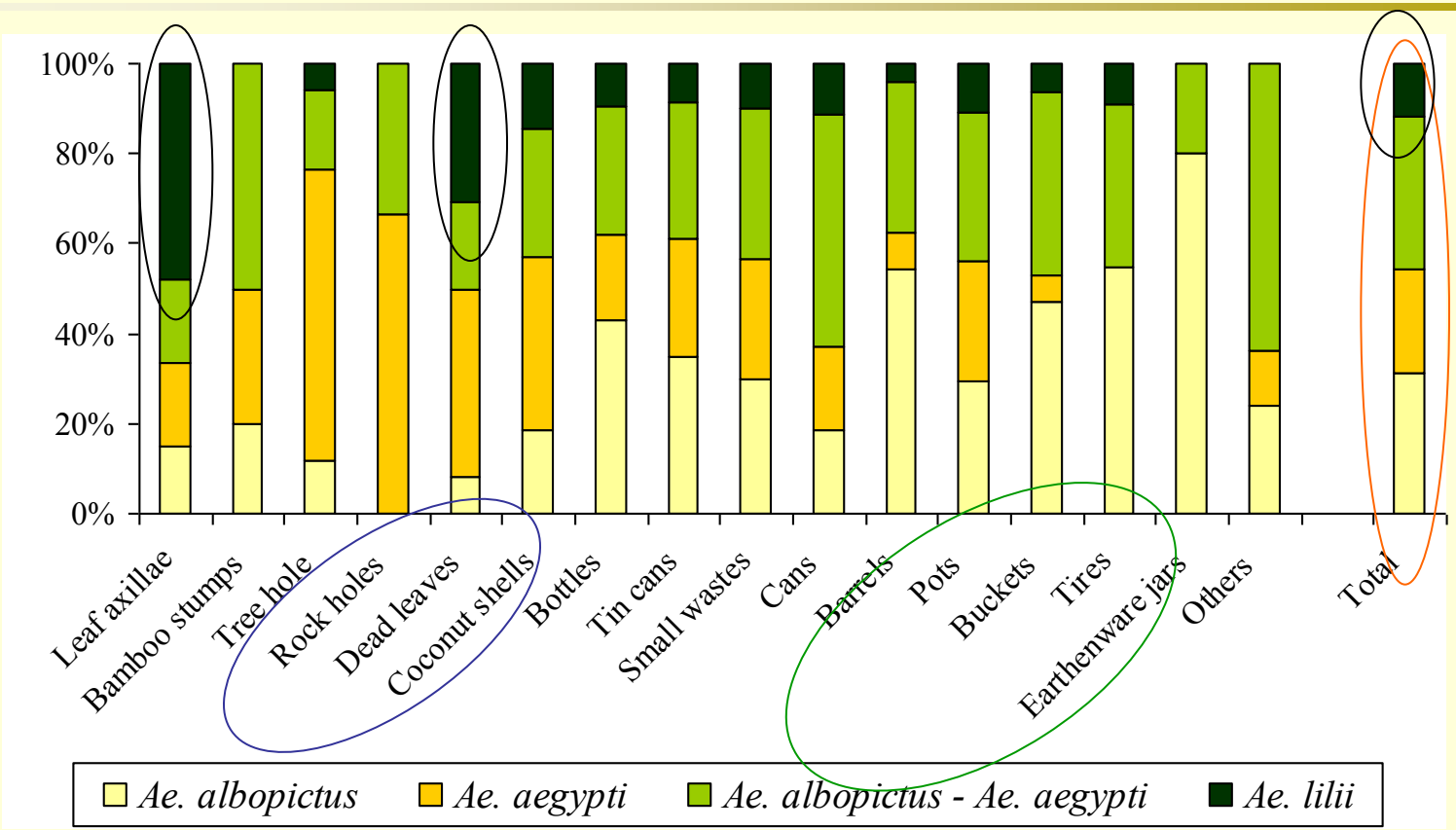


- 2 seasons
- 6 locations
- 3 habitats
  - 10 houses in **urban** and **suburban** areas
  - 1 ha in **rural** areas
- Larval identification
- Only breeding sites with *Aedes* spp.



Results

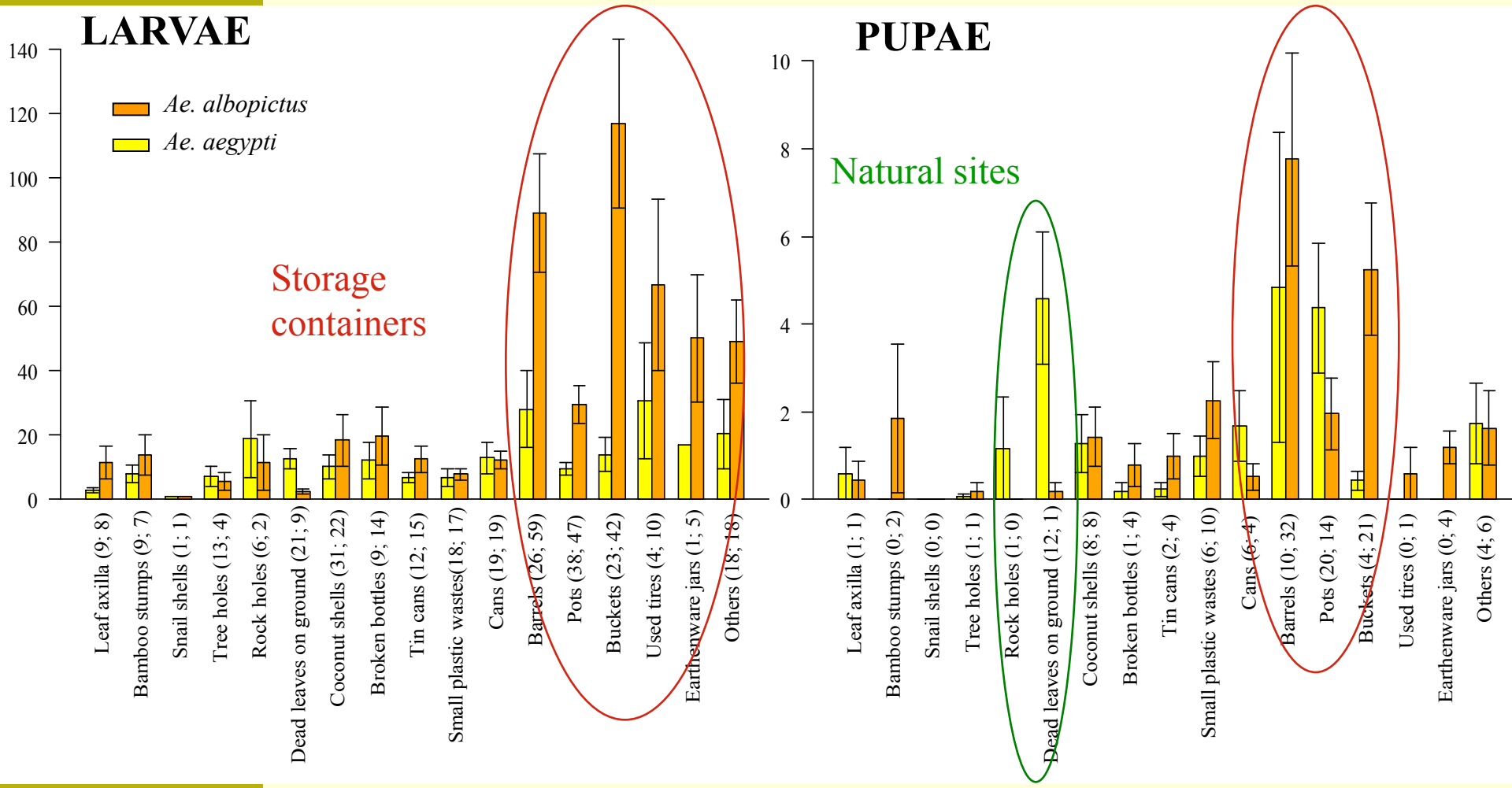
Breeding sites surveyed



- ***Ae. albopictus*** and ***Ae. aegypti*****,** often share the same breeding site
- ***Ae. albopictus*** more in **artificial** breeding sites
- ***Ae. aegypti*** more in **natural** breeding sites
- ***Ae. lilii*** rare and more in **natural** breeding sites

Results

Average productivity of breeding sites



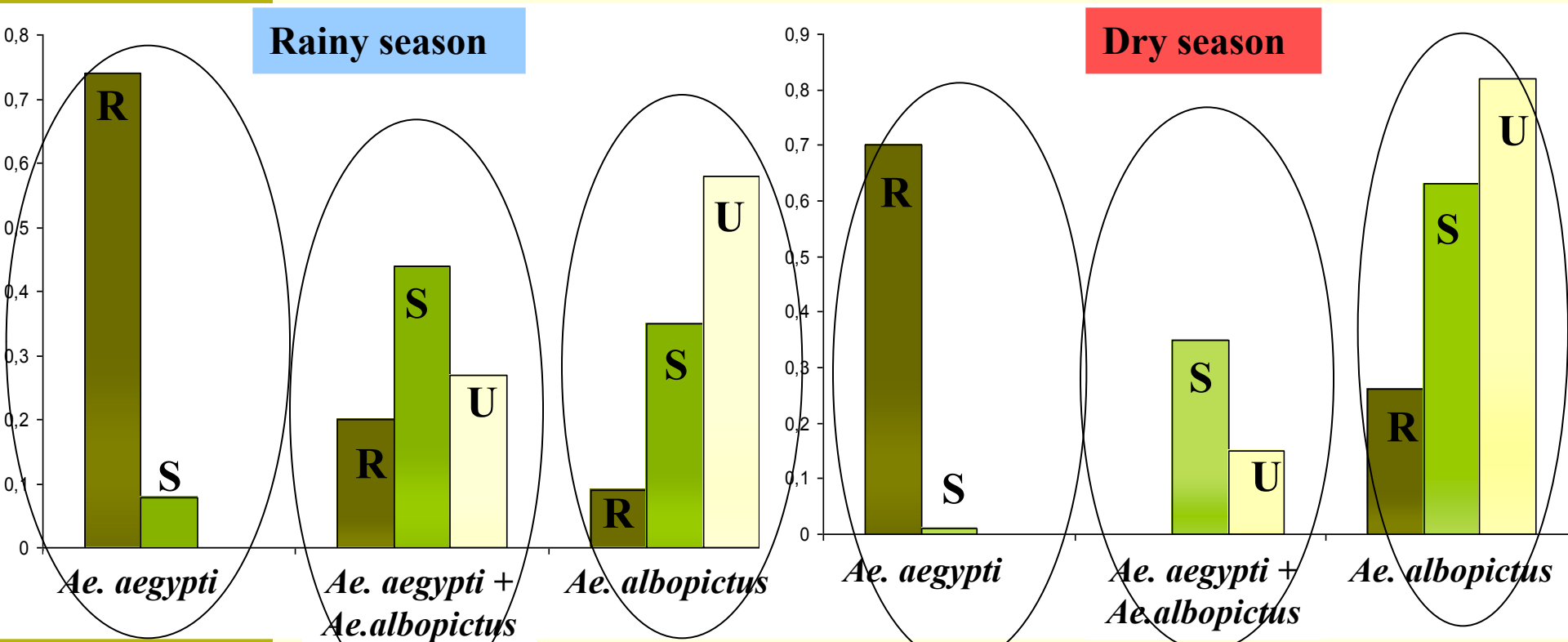
Larvae *Ae. albopictus* >>> Larvae *Ae. aegypti*

Pupae *Ae. albopictus* > Pupae *Ae. aegypti*

Pupae *Ae. albopictus* < Pupae *Ae. aegypti*

Estimated relative frequency of species in rural (R), suburban (S) and urban (U) habitats

Location: Bandrélé



more in rural areas

more in suburban areas

more in urban areas

Conclusion

Aedes spp. distribution in Mayotte

- ***Ae. lilii* :**
  - Uncommon
  - Very rural
  - Natural breeding sites

Poor implication in arboviruses emergence in Mayotte

- ***Ae. aegypti* :**
  - Rural
  - Natural breeding sites

- ***Ae. albopictus* :**
  - **Rapid spread in Mayotte**
  - **Artificial breeding sites**
  - **Occurrence in urban areas**

Conclusion

Effect on resident species?

- **Displacement of *Ae. aegypti* to rural habitats by *Ae. albopictus* is on-going in Mayotte**
  - Probably due to competitive interactions between these 2 species (Williamson 1996; Juliano 2004)
  - Further studies are required to identify mechanisms involved in the eventual competition

Conclusion

Effect on public health?

- It may have **modify arboviruses transmission** in Mayotte like in other countries (Mitchell 1995; Lounibos 2002)
- Probably the **major vector implicated in the Chikungunya epidemics** in 2005-2006 because of its dominance in inhabitated areas and its good transmission competence for this virus (Vazeille 2007)
- As it preferentially colonizes storage containers a **mechanic control** can be suggested to reduce the populations of this vector

Bagny *et al.* 2008 submitted



Thank you for your attention